

Secular trends in the management of hypertension and atrial fibrillation in patients presenting with stroke

D.G. SMITHARD, I. PEREZ¹ and L. KALRA¹

From the William Harvey Hospital Ashford, Kent and ¹King's College School of Medicine & Dentistry, London, UK

Received 23 June 1999 and in revised form 5 October 1999

Summary

We studied changes in stroke prevention in 2000 ischaemic stroke patients using prospectively collected data from an incident stroke register over 3 years. Patients were divided into those with risk factors but no previous history of a vascular event (asymptomatic vascular disease) and those with risk factors and a previous history of stroke or TIAs, ischaemic heart disease, angina, myocardial infarction or peripheral vascular disease (symptomatic vascular disease). Time trends were analysed for the use of aspirin, management of hypertension and atrial fibrillation prior to the presenting episode. Median age of those with known risk factors included in the study was 75 years (range 44–99 years); 60% were women. Year-by-year analysis showed no differences in demography, stroke characteristics or vascular risk profile. The use of aspirin for symptomatic vascular disease

increased with time (28% to 72%) ($p < 0.001$), but did not increase for asymptomatic vascular disease, despite risk factors being present. The proportion of patients receiving antihypertensive treatment for symptomatic vascular disease was unchanged with time (66% to 64%) but there was a significant increase in the number of patients receiving antihypertensive treatment for asymptomatic vascular disease (28% to 44%) ($p < 0.05$). The proportion of patients with atrial fibrillation receiving antithrombotic treatment did not increase for asymptomatic vascular disease (23% to 21%) ($p = 0.54$) but did increase for symptomatic vascular disease (19.5% to 37%) ($p < 0.01$) over 3 years. The use of warfarin in atrial fibrillation increased both in the case of asymptomatic (4.5% to 42%) ($p < 0.01$) and symptomatic vascular disease (12.5% to 33.0%) ($p < 0.01$).

Introduction

Several well-designed randomized controlled studies have shown that identification and treatment of vascular risk factors reduces the incidence of stroke.^{1–4} The most relevant interventions in this context are control of hypertension, use of aspirin for primary and secondary prophylaxis, and anticoagulation in patients with atrial fibrillation. There now is overwhelming research evidence to support aggressive management of these risk factors, which has been widely publicized in medical and non-medical literature. In addition, management of vascular risk factors has been prioritized in national healthcare programmes, and significant resources

have been targeted towards health education, screening and intervention in the last few years.⁵

There are fears that research evidence or health initiatives may fail to change clinical practice and management of cardiovascular risk factors in clinical care may remain sub-optimal.⁶ Past studies have shown that preventive care is inadequate in patients at risk, even after a vascular event has taken place.^{7–10} However, there is optimism that a co-ordinated strategy aimed at increasing awareness of stroke as a major health issue may result in improvements, both in primary and in secondary prevention.¹¹ The objective of this study was to see if this optimism

Address correspondence to Dr D.G. Smithard, Department of Elderly Health, William Harvey Hospital, Kennington Road, Willesborough, Ashford, Kent TN24 0LZ

© Association of Physicians 2000

was justified by studying year-on-year changes in primary and secondary prevention (treatment of atrial fibrillation, hypertension and the use of antithrombotic agents) for stroke in a large sub-urban population in south-east England.

Methods

We analysed incident stroke register data for a population of 550 000 collected prospectively for 3 years starting January 1994. The stroke register included all patients admitted to hospital with a diagnosis of stroke, regardless of location. First-ever and recurrent strokes were included. All admissions to hospital were screened on a daily basis, and those with a presumptive diagnosis of stroke were assessed by a stroke specialist to confirm the diagnosis. Case ascertainment was undertaken by comparisons with the hospital activity analysis databases. The WHO definition of stroke was used, and initial diagnosis was based on history and clinical examination by specialists in stroke. The diagnosis and pathology of stroke was confirmed by CT scanning in 89% of the patients included in the study. Data were collected meticulously on patient and stroke characteristics, and frequency of risk factors from patients, relatives, general practitioners and hospital sources, and were cross-validated for completeness and accuracy. A comprehensive review of management prior to the stroke was undertaken using the sources described above to collect information on known risk factors and their management before the presenting episode. Special care was taken in collecting information about the use of aspirin, because low-dose aspirin is often not regarded as medication or may be used without prescription. In addition, the patient (wherever possible) or their families were questioned directly about compliance with treatment.

All patients with a diagnosis of ischaemic stroke on the register were divided into two groups: those no previous history of a vascular event (asymptomatic vascular disease) and those with a previous history of stroke or TIAs, ischaemic heart disease, angina, myocardial infarction or peripheral vascular disease (symptomatic vascular disease). The prevalence of known risk factors was recorded in both groups. Time trends were analysed for the use of aspirin and the management of hypertension, diabetes mellitus and atrial fibrillation prior to the presenting episode. The criteria for identification these risk factors were based on accepted recommendations in literature.^{12–14} The use of medication for the treatment of hypertension was confirmed from the history and by directly asking the patient. Medication that had an antihypertensive effect but was being used to treat

another medical condition (ischaemic heart disease etc.), was not recorded as antihypertensive.

Results were analysed using Minitab v8.2. Parametric data were analysed with the *t* test for unpaired data. Dichotomous variables were analysed using the two-tailed χ^2 test for significance at the 5% level.

Results

The median age of patients included in the study was 75 years (range 44–99 years) and 60% were females (Table 1). Year-by-year analysis showed that there were no significant differences in the demography, stroke characteristics or vascular risk profile of patients with time (Table 1).

Symptomatic vascular disease (TIAs, stroke, angina, myocardial infarction or peripheral vascular disease) was present in 1139 (57%) patients prior to the presenting episode. Aspirin for prevention of vascular events (myocardial infarction, stroke or peripheral occlusion) was used more frequently in patients with symptomatic vascular disease than in asymptomatic patients (54.6% vs. 16.8%; $p < 0.0001$) despite no differences in risk factor prevalence. The dose of aspirin varied between 75 mg and 300 mg, with most patients being on lower doses (75 or 150 mg). Year-by-year analysis showed a significant increase in the use of aspirin in symptomatic vascular disease (28% to 72%; $p < 0.001$), but a similar trend was not seen in the use of aspirin for asymptomatic vascular disease (Table 2).

Of the 882 known hypertensives, 486 (55%) were receiving antihypertensive treatment prior to their stroke. A significantly greater proportion of patients with previous vascular events were receiving antihypertensive treatment compared with patients known to have hypertension but no vascular events (66% vs. 36%; $p < 0.001$). The proportion of patients receiving antihypertensive treatment in the presence of symptomatic vascular disease did not change with time (Table 2). However, there was a significant increase in the number of patients receiving antihypertensive treatment in the presence of asymptomatic vascular disease (28% to 44%) ($p < 0.05$).

The proportion of patients with atrial fibrillation being anticoagulated rose from 4.5% in the first year to 42% ($p < 0.01$) in the third, with increased use following a stroke of 12.5% to 33.0% ($p < 0.01$) in the third year. The proportion receiving aspirin for atrial fibrillation remained constant (23% to 21%) ($p = 0.45$), but following a stroke there was increased usage (19.5% to 37%) ($p < 0.01$) by the third year.

Table 1 Demography, stroke characteristics and risk factor profile of patients with ischaemic strokes included in the study

Year	1994	1995	1996	<i>p</i>
No. of strokes	598	798	604	–
Mean age (years)	75.4 ± 15.2	73.8 ± 19.6	76.4 ± 11.3	NS
Age range (years)	57–93	46–97	44–99	
Females	338 (57%)	472 (59%)	376 (62%)	NS
<i>Risk factors</i>				
Hypertension	255 (43%)	341 (43%)	286 (47%)	NS
Previous stroke/TIA	224 (37%)	278 (35%)	194 (32%)	NS
Atrial fibrillation	94 (16%)	130 (16%)	120 (20%)	NS
Ischaemic heart disease	186 (31%)	260 (33%)	201 (33%)	NS

Table 2 Year-by-year analysis of prior treatment of known risk factors in patients with ischaemic stroke

	1994		1995		1996	
	ASVD	SVD	ASVD	SVD	ASVD	SVD
All	249	349	320	478	292	312
Aspirin	25 (10%)	99 (28%)	88 (28%)	229 (48%)	32 (11%)	224 (72%)
Hypertension (totals)	116	139	125	216	88	198
No. treated	32 (28%)	93 (67%)	48 (38%)	147 (68%)	39 (44%)	127 (64%)
Atrial fibrillation (totals)	22	72	8	92	33	87
Warfarin	1 (5%)	9 (13%)	11 (29%)*	25 (27%)*	14 (42%)**	29 (33%)**
Aspirin	5 (23%)	14 (20%)	15 (40%)	29 (32%)	7 (21%)	32 (37%)**

ASVD, Asymptomatic vascular disease; SVD, Symptomatic vascular disease. * $p < 0.05$, 1994–1995. ** $p < 0.01$, 1994–1996.

Discussion

In contrast to previous studies showing poor implementation of prevention in stroke,^{7–10} this study shows that preventive measures are undertaken in a large proportion of patients at risk prior to the presenting episode. This appears to be particularly true for patients with a prior history of vascular events requiring secondary prevention, in whom the effectiveness and benefits of such interventions are likely to be greater. The study also shows an encouraging trend in the management of asymptomatic vascular disease, with increasing recognition and management of risk factors, especially hypertension and atrial fibrillation.

The improvements in secondary prevention may be due to several reasons. It is likely that vascular events alert physicians to actively screen for risk factors, and that the benefits of active management are perceived as being greater in this group. Specialist involvement is likely to be greater in this group, resulting in improved screening and aggressive management of risk factors.^{6,15} In addition, patients who have experienced a vascular event are known to be more willing to seek help and comply with prevention programmes.^{16,17} On the other hand, the positive trends in the management of vascular disease reflect a change in perceptions and practice of primary-

care physicians resulting from published evidence, availability of peer-approved guidelines and prioritization of cardiovascular risk prevention in the national strategy for health.^{11,18}

The limitations of indirect assessment of stroke prevention based on incident stroke need to be acknowledged. The denominator here is the number of patients suffering a critical event and presenting to the stroke service rather than those with vascular risk, giving rise to the possibility of under or overestimating the proportion of patients being managed. In addition, this study addressed the basic question of estimating the proportion of stroke patients who received any treatment for vascular risk factors prior to ictus, regardless of appropriateness or quality of control. Subsequent studies have shown this to be an issue.¹⁹ More refined information can only be provided by prospective longitudinal studies in large numbers of patients with vascular risk managed in several settings. Such studies are expensive, labour-intensive and difficult to undertake because of logistic considerations of multiplicity of sites, coordination of data sources and duration of follow-up. On the other hand, the need for this information cannot be ignored and there are pressures to develop alternative methods to monitor prevention, which will be simpler but complementary to the very expensive pro-

spective studies. It has been difficult to collect such data as a part of health monitoring by health commissioning agencies across Britain, despite being a major primary-care health priority in their strategic plans.²⁰ An alternative is to use information contained in incident vascular event registers which are widely maintained, contain comprehensive and reliable data on vascular risks and can be used to follow secular trends in defined patient groups, often only hospital-based. The feasibility of this approach has been shown in this study based on meticulous analysis of accurate data in over 85% of known stroke patients in a large population.

The study could be criticized for not monitoring smoking, treatment of cholesterol and other lifestyle issues. At the time of this study cholesterol was not proven to be a risk factor for ischaemic stroke, and even now there is little evidence for lowering cholesterol as secondary prevention for stroke. The evidence at present only supports the lowering of cholesterol following ischaemic heart disease.²¹ Although it was possible to determine the number of patients who were smokers at the time of presentation, it proved very difficult to evaluate the proportion of patients who may have received advice on smoking as this was inconsistently recorded in previous medical notes and patient information on lifestyle (smoking, exercise, diet, alcohol) was often unreliable.

The observation that risk factor intervention in stroke is improving with time is encouraging, but preventive measures are still not being undertaken in a significant number of patients with known vascular risk factors. The study highlights the need for an increased awareness to the management of risk factors. This can be achieved by undertaking initiatives aimed at prevention in primary care (e.g. hypertension, well man, well women, over 75 years clinics) which will not only increase the proportion of 'at risk' patients being identified and receiving treatment but also improve the quality of risk management.⁴ In addition, prioritization of vascular risk prevention in its broadest sense, by developing protocols for screening and management of risk factors across the primary and secondary care interface, will pay further dividends.^{4,6} Such strategies are likely to be a feasible and cost-effective in improving cardiovascular health, and merit investment and further investigation.

References

1. Feinberg WM. Primary and secondary stroke prevention. *Curr Opin Neurol* 1996; **9**:46–52.
2. Barnett HJ, Eliasziw M, Meldrum HE. Drugs and surgery in the prevention of ischaemic stroke. *N Engl J Med* 1995; **332**:238–48.
3. Bronner LL, Kanter DS, Manson JE. Primary prevention of stroke. *N Engl J Med* 1995; **333**:1392–400.
4. Robinson JG, Leon AS. The prevention of cardiovascular disease. Emphasis on secondary prevention. *Med Clin N Am* 1994; **78**:69–98.
5. Department of Health. *Health of the Nation: a strategy for health in England* (Cm1986). London, HMSO, 1992.
6. Bowker TJ, Clayton TC, Ingham J, McLennan NR, Hobson HL, Pyke SD, Schofield B, Wood DA. A British Cardiac Society survey of the potential for the secondary prevention of coronary disease: ASPIRE (Action on Secondary Prevention through Intervention to Reduce Events). *Heart* 1996; **75**:334–42.
7. Bath PMW, Prasad A, Brown MM, MacGregor GA. Survey of use of anticoagulation in patients with atrial fibrillation. *Br Med J* 1996; **312**:45–9.
8. Albers GW, Yim JM, Belew KM, Bittar N, Hatterer CR, Phillips BG, Kemp S, Hall EA, Morton DJ, Vlasses PH. Status of antithrombotic therapy for patients with atrial fibrillation in university hospitals. *Arch Intern Med* 1996; **156**:2311–16.
9. Black HR. Blood pressure control. *Am J Med* 1996; **10**:A50S–55S.
10. Nothwehr F, Elmer P, Hannan P. Prevalence of health behaviours related to hypertension in three blood pressure treatment groups: the Minnesota Heart Health Program. *Prevent Med* 1994; **23**:362–8.
11. European Stroke Council. *Pan European Consensus Statement on Stroke Management: the Helsingborg Declaration*. World Health Organisation Regional Office for Europe, 1995.
12. Sever P, Beevers G, Bulpitt C, Lever A, Ramsay L, Reid J, Swales J. Management guidelines in essential hypertension: report of the second working party of the British Hypertension Society. *Br Med J* 1993; **306**:983–7.
13. Lip GY, Lowe GD. ABC of Atrial Fibrillation. Antithrombotic treatment for atrial fibrillation. *Br Med J* 1996; **312**:45–9.
14. Stroke Council of the American Heart Association. Guidelines for the management of transient ischaemic attacks. From the Ad Hoc Committee on Guidelines for the Management of Transient Ischaemic Attacks of the Stroke Council of the American Heart Association. *Stroke* 1994; **25**:1320–35.
15. Goldstein LB, Farmer A, Matchar DB. Primary care physician reported secondary and tertiary stroke prevention practices. *Stroke* 1997; **28**:746–51.
16. Ramsden VR, Shuaib A, Reeder BA, Khan K, Liu L. Risk factor awareness: a randomized telephone survey of public knowledge. *Can J Public Health* 1994; **85**(Suppl 2):S57–60.
17. OXCHECK Study Group of the Imperial Cancer Research Fund. Effectiveness of health checks conducted by nurses in primary care: results of the OXCHECK study after one year. *Br Med J* 1994; **308**:308–12.
18. Kalra L, Perez I, Melbourn A. Stroke risk management: changes in mainstream practice. *Stroke* 1998; **29**:53–7.
19. Perez I, Melbourn A, Kalra L. The use of anticoagulation in atrial fibrillation for stroke prevention. *Heart* 1999; in press.
20. Department of Health. *On the state of Public Health: the annual report of the Chief Medical Officer of the Department of Health*. London, HMSO, 1996.
21. Blauw GJ, Layoay M, Smelt AHM, Westendorp RGJ. Stroke, statins and cholesterol. *Stroke* 1997; **28**:946–56.